

New acute models of care for children and young people

A review of potential new
models of care to reduce
emergency attendances



About this document

This document is aimed at commissioners interested in developing new models to deliver out of hospital healthcare services for children and young people. It is designed to help commissioners evaluate whether an out-of-hospital model would work well in their area. It describes an **audit** that was carried out across six emergency departments **in London** over a two-week period during **February** and March 2016.

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Executive summary

The development of new out of hospital models of care for children and young people offers opportunities to improve quality and reduce emergency department attendances by children and young people. To date there has been little data available to inform commissioners and providers when planning new models. It has also been unclear what proportion of children and young people could be managed by new models, which conditions, and the workforce needs and costs or benefits associated.

Healthy London Partnership's Children and Young People's Programme undertook a project aimed at quantifying the potential for new models of care to reduce attendances by children and young people at emergency departments in London.

Prospective data were collected about 3,020 children and young people aged 0 -17.9 years, by experienced clinicians, across six London emergency departments, from 10am to 10pm, over two weeks in winter 2016. Data collected included clinical needs, investigation and management undertaken, and whether the child could be managed in proposed out-of-hospital models. The information was used to identify which children could have been safely and appropriately managed outside of hospital settings.

Nine models were identified for study in three groups, plus a comparison of two current models.

1) Three community models treating illness but not injury

- Nurse-led acute illness team for children and young people
- Nurse-led walk-in centre for illness in children and young people
- Multi-speciality community provider for children and young people

2) Enhanced primary care models i.e. enhancement of paediatric expertise

- Enhanced GP practice
- GP confederation children and young people service

3) Comprehensive models

- Community walk-in centre for children and young people
- PACS acute health centre for children and young people

Two current primary care models were also comparatively assessed

- Community pharmacy
- Current GP practice.

The results demonstrated the proportions of children and young people presenting to emergency departments that could be appropriately managed within each new model. This ranged from 14.1% for a nurse-led acute illness team, to 75.5% for a PACS service.

It showed that 9.5% of children and young people presenting could have been managed in current community pharmacy and 22.3% in current GP practices. Enhancement of current general practices with paediatric expertise could have managed 28.4%, while a coordinated GP confederation children and young people service could have managed 44.6%.

Financial data was also collected for each attendance. We are currently identifying workforce needs for each model. This will allow us to provide data for commissioners and providers on the potential benefits of each model for reducing children and young people's attendance to emergency departments.

Introduction

Purpose

Healthy London Partnership formed in April 2015. It has been working across health and social care, and with the Greater London Authority, Public Health England, NHS England, London's councils, the 32 Clinical Commissioning Groups, and Health Education England. Partners united to amplify the efforts of a growing community of people and organisations that believe it is possible to achieve a healthier, more liveable global city by 2020. It works to deliver changes that are best done once for London. It is also in the unique position to support the delivery of London's five sustainability and transformation plans by using strategic advice, resources and staff embedded in the areas. It's Children and Young People's Programme's vision is for an integrated system for health and care services that promotes health and wellbeing and can be easily navigated by children, their families and health professionals to achieve the best outcomes.

Audience

This document is aimed at commissioners interested in developing new models to deliver out-of-hospital (OOH) healthcare services for children and young people. The document describes the audit that was carried out across six London emergency departments during a two-week period in February and March 2016. During the audit, clinicians reviewed 3,020 children and young people attendances from 10am to 10pm and considered whether the child could be managed in one of the proposed out-of-hospital models. The report is designed to help commissioners evaluate whether an out-of-hospital model would work in their area and which one could work best.

Strategic context

This document is part of a portfolio of out-of-hospital care products developed by the Healthy London Partnership Children and Young People's Programme Team to drive improvements in quality.

- Compendium: [New models of care for acutely unwell children and young people](#)
- [London's out of hospital standards for children and young people](#)¹ - this is a set of robust standards bringing together information and national guidance to support clinical vision and future strategies for the delivery of health care in settings outside of hospital. These relate to the needs of children and young people who are acutely unwell, have an exacerbation of a long term condition or who have complex/continuing needs, and whose care can be provided safely outside of hospital. The purpose of the document is to support commissioners and providers of children's out-of-hospital health services with what the expected minimum standards of care are for community children's or out of hospital services.
- Opportunities for pharmacy to support out of hospital care (in development)
- New models of care

Themes

This suite of documents will help organisations develop place-based models of care treating the children and young people in the most appropriate location for their needs.

In order to differentiate between the models, they have been categorised by their overarching aim.

Background

A number of recent reports recommend significant transformation in the way that primary care and acute non-hospital services are delivered for children and young people across the capital: [Five Year Forward View](#); [Transforming Primary Care in London: A Strategic Commissioning Framework](#); [Children and young people's health services in London: a case for change](#). These documents combine to set out a vision for new models of care and service delivery. They describe fundamental changes to the range, consistency and quality of services available to all patients, with a drive to care for them in a non-hospital setting.

In response, there has been widespread development of out-of-hospital models of care for adults; however, progress for children and young people lags behind. During the 2015 Vanguard process, no care models specific to children and young people were successful. Although some innovative pilot models exist across the country, many feel that there is a lack of sufficient information, particularly regarding the financial and workforce implications, to support more widespread implementation of acute models of care for children and young people. This project aimed to provide commissioners and providers of services in London with more up-to-date financial information about new models of care for children and young people.

Current challenges in London

Emergency department (ED) and acute activity levels are high and rising:

- A quarter of Londoners are children and aged under 18 and this population is rising across London.
- Children and young people currently account for more than a quarter of acute activity in EDs and GP surgeries.
- The attendance rate for children and young people at EDs is rising – by as much as 42% each decade.¹
- Admission rates to hospital are rising – between 1999 and 2010, there was a 28% general increase with a doubling of very short-stay admissions (< 24 hours) for common febrile illnesses of children and young people.²

Quality of care:

- Many children and young people and their families experience difficulties in accessing and navigating acute services.
- There can be variation and fragmentation across the system.
- Workforce (recruitment and retention of healthcare staff, and an ageing workforce in primary care)
- There is variation in the levels of healthcare professionals specifically skilled in caring for children and young people. The recognition of the acutely unwell child is a particular challenge – The Confidential Enquiry into Maternal and Child Health report of 2008 showed that 26% of child deaths were due to an 'identifiable failure in the child's direct care' and attributed many errors by staff to inadequate paediatric training or supervision

Potential benefits

Models of healthcare for children and young people that shift care to out of hospital settings could have the following benefits:

- Delivery of safe, effective care close to and within the patient's home.
- Less disruption to the patient and family.
- Improved patient/family experience of healthcare.
- Reduction in the number of unnecessary ED attendances.
- Reduction in the number of unnecessary hospital admissions.

Alternative or new models of care

In a separate area of work, we undertook a review of services implementing out of hospital models of care for acutely unwell children across the UK and identified over 30 active services. Case studies of these services were published in [Compendium –new models of care for acutely unwell children and young people](#).

Themes

Services were categorised into themes according to their objectives. The themes outlined below are the themes that were explored in this study.

Table 1: Themes

A		Models that primarily prevent acute presentation to the Emergency Department (ED) and/or Admission to Hospital
Example	Salford Children’s Community Partnership, which places Acute Paediatric Nurse Practitioners (APNPs) in the primary care setting to see CYP with acute illness and injury	
B		Models that primarily reduce length of stay in hospital
Example	Whittington Hospital @ Home which delivers a nurse-led acute Paediatric service delivered to families in their home, supported by the local hospital’s acute paediatric team	
C		Models that aim to prevent both Emergency Department attendance/ admission to hospital AND reduce length of stay in hospital
Example	C.O.A.S.T NHS Solent Trust, a nurse-led team that can receive referrals from both primary and secondary care for home visits for children and young people	
D		Models that primarily manage non-acute illness, but have a direct impact on acute activity
Example	Connecting care for children in North West London which has three key components (specialist outreach, with specialists from the hospital working alongside primary care professionals; open access, with GPs having access to specialist advice via an email and telephone hotline; and patient and public engagement, built around practice champions who are working with the team to co-design services).	

For this study we were interested only in those models which are aimed to prevent ED attendances i.e. themes A and C, plus D to some extent.

Illness versus injury

When examining new out of hospital models, it is important to separate services for acutely unwell children from those that also / instead focus on injuries. The main integrated care initiatives for CYP focus on illness rather than injury, as:

- I. febrile illnesses are the main drivers of ED presentations in younger children and
- II. alternative models are often based upon broadening the skills of nurses or other clinicians with illness rather than with injury.

Note that up to 70% of CYP presenting to Emergency Departments with medical problems have one of the following six conditions:

- 1) Breathing difficulty (20%)
- 2) Febrile illness (14%)
- 3) Diarrhoea +/- vomiting (14%)
- 4) Abdominal pain (7%)
- 5) Seizure (6%)
- 6) Rash (9%)

This relatively limited set of common illness presentation has allowed the development of new models based upon new workforce roles (e.g. advanced paediatric nurse practitioners (APNPs)) managing a limited set of common conditions using strict management algorithms.

The study

Aim of the study

This project aimed at quantifying the potential for new models of care to reduce attendances by children and young people at EDs in London. The results would provide commissioners and providers of services with clinical and financial information about the potential benefits of new models of care.

The study aimed to answer the two following questions:

1. What proportion of children and young people presenting to London EDs could be appropriately treated in new out of hospital models, thus avoiding ED presentation?
2. Which groups of children and young and which conditions could be appropriately treated in new out of hospital models, thus avoiding ED presentation?

We proposed the following three-step process to enable understanding of potential financial impact of the new models of care for children and young people:

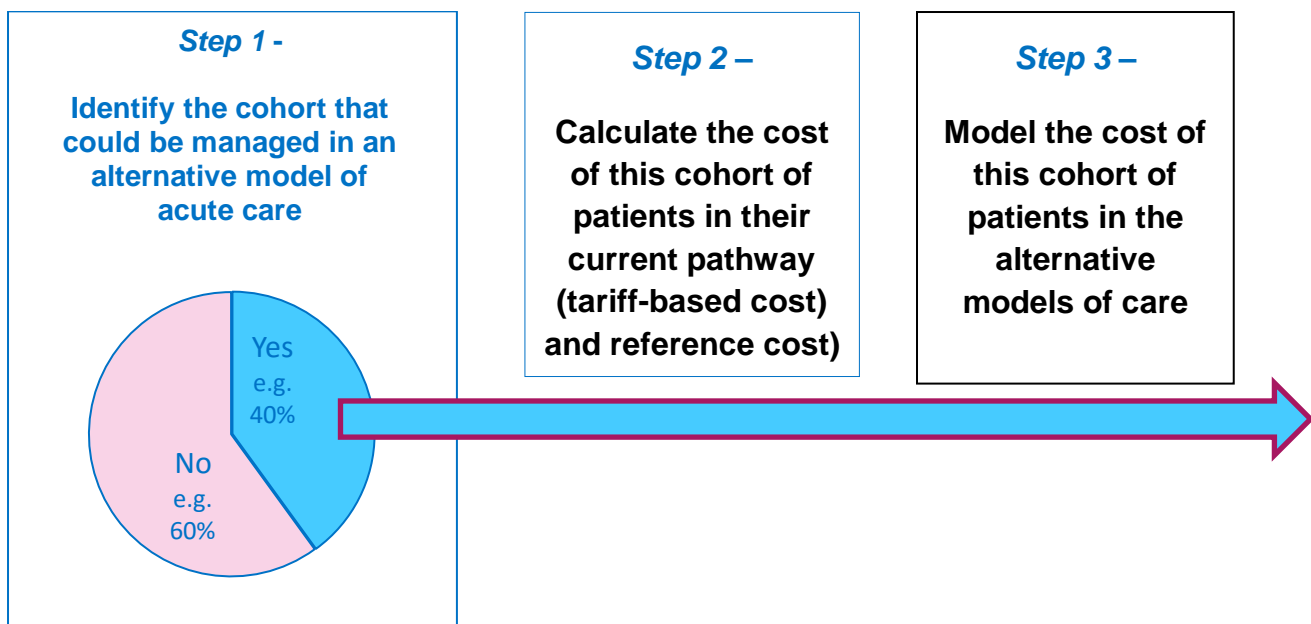


Figure 1: Three-step process to understanding potential financial impact

Models assessed

From the [Compendium - new models of care for acutely unwell children and young people](#), seven key models were identified for the study. In addition for comparative purposes we also assessed two current primary care models: community pharmacy and current general practice.

Table 3: Seven key models

	Model and site	Descriptor	Site	Observation facilities?	Health education opportunities
Enhanced illness assessment and management models					
1	Within general practice: Nurse-led Acute Illness Team for children and young people	Advanced Paediatric Nurse Practitioner (APNP) appointment-only service, using algorithms to manage a limited set of common illnesses.	GP practice	No	Limited
2	In community: Walk-in Centre for Illness in children and young people	Walk-in centre with APNPs using algorithms to manage a limited set of common illnesses (> than Model 1)	Community centre	Yes <6hrs	Limited
3	Multi-specialty Community (MCS) Provider for children and young people	MCS providing appointment-only service focused on illness, including GPs and daily paediatric input (telephone or face to face). Broad range of illnesses treated.	GP practice	No	Limited
Enhanced general practice models					
4	Enhanced GP practice	GP practice with extended hours, walk-in opportunities & regular visits/contact with paediatrician (available within 48hrs)	GP practice	No	Yes
5	GP confederation children and young people service	APNPs and GPs working within GP confederation so can see minor injuries plus illness, appointment only, extended hours, & regular visits/contact with paediatrician (available within 48hrs)	GP practice	No	Yes
Comprehensive assessment and management models					
6	Community: Walk-in Centre for Illness & Injury in children and young people	APNPs in walk-in centre using algorithms to manage illness and injuries	Community Centre	Yes <6hrs	Limited
7	Hospital: Primary and Acute Care System (PACS) Acute Health Centre for children and young people	Primary and acute care system (PACS) model with GPs, APNPs on hospital site with rapid access to paediatric and other specialists	GP practice on Hospital site	Yes <6hrs	Yes

Findings from the study

Data were prospectively collected about 3,020 children and young people attending six London EDs during peak hours (1000h to 2200h) in peak season (Feb/March). This was used to identify the proportion of ED attendances that could potentially be appropriately managed in a range of out-of-hospital models of care (see Table 4). Trust financial information on the same patients was used to identify average costs to CCGs per patient for those potentially manageable outside of hospital care (see Table 5).

Clinicians reported that around 50% of ED presentations could potentially have been avoided with better health promotion or greater family confidence in self-management (or both). This is consistent with previous findings. A systematic review concluded that 20-24% of ED presentations were inappropriate;³ a national study in England in 2011/12 found that inappropriate ED presentations were highest amongst young children and teenagers and young adults.⁴ Another systematic review found that low health literacy is associated with higher risk of ED presentation.⁵

Certain models had the potential to manage large proportions of children and young people outside hospital (see Table 4). While an enhanced GP practice could potentially manage around one-quarter of patients, an enhanced children and young people's service across a GP confederation could potentially manage nearly half (45%) of current ED presentations. More comprehensive services – for example, a community walk-in centre managing illness and injury or a PACS model for children and young people, could potentially manage 65-75% of current ED presentations. Models for managing illness alone could potentially manage smaller proportions of ED presentations. There was marked variation across the sites for some of the models, particularly illness-only models. These may relate to local variations in non-use of primary care for febrile children, with higher use in deprived communities.⁶

Data on current models existing in primary care were provided for comparison. We estimated that nearly 10% of ED presentations could be appropriately managed by community pharmacies. Around one-fifth were appropriately managed in current (not enhanced) general practice.

These data were designed to be useful to CCGs and other commissioners as well as to providers in planning and commissioning new alternatives to hospital care to reduce ED presentations and improve quality of care for children and young people.

Table 4: Proportion of attendance suitable for out-of-hospital care models

		Descriptor	Site	Observation facilities?	Health education opportunities	Total	Range across the 6 ED sites
Enhanced illness assessment and management models							
1	Within general practice: Nurse-led Acute Illness Team for CYP	Advanced Paediatric Nurse Practitioner (APNP) appointment-only service, using algorithms to manage a limited set of common illnesses (based on Salford model).	GP practice	No	Limited	14.1%	(8.3-20.5)
2	In community: Walk-in Centre for Illness in CYP	Walk-in centre with APNPs using algorithms to manage a limited set of common illnesses (broader than Model 1)	Community centre	Yes <6hrs	Limited	28.4%	(14.9-49.7)

3	Multi-speciality Community Provider for CYP	MCS providing appointment-only service focused on illness, including GPs and daily paediatric input (telephone or face to face). Broad range of illnesses treated.	GP practice	No	Limited	25.7%	(19.5-26.9)
Enhanced general practice models							
6	Enhanced GP practice	GP practice with extended hours, walk-in opportunities & regular visits/contact with paediatrician (available within 48hrs)	GP practice	No	Yes	28.4%	(16.7-44.5)
7	GP confederation CYP service	APNPs and GPs working within GP confederation so can see minor injuries plus illness, appointment only, extended hours, & regular visits/contact with paediatrician (available within 48hrs)	GP practice	No	Yes	44.6%	(34.5-55.9)
Comprehensive assessment and management models							
4	Community: Walk-in Centre for Illness & Injury in CYP	APNPs in walk-in centre using algorithms to manage illness and injuries	Community Centre	Yes <6hrs	Limited	64.3%	(57.5-70.7)
5	Hospital: PACS Acute Health Centre for CYP	PACS (Primary & Acute Care System) model with GPs, APNPs on hospital site with rapid access to paediatric and other specialists	GP practice on Hospital site	Yes <6hrs	Yes	75.5%	(68.4-80.1)
Comparators: current primary care models							
	Community Pharmacy	Standard current community pharmacy	Community	No	Yes	9.5%	(0.8-27.6)
	Current GP Practice	Standard current GP practice	GP Practice	No	Limited	21.1%	(15.2-28.2)

Table 5: Financial data

Note: financial data are not available for the comparator models (Community Pharmacy, standard General Practice)

Model	Number of eligible patients	Eligible patients as a proportion of total (%)	Total Costs (£)	Average cost per patient (£)
Model: enhanced illness and assessment				
Acute illness team for CYP	381	14%	37,359	98
Walk in Centre for Illness in CYP	732	28%	84,843	116

Multi-Specialty Community Provider for CYP	706	27%	75,481	107
Model: Comprehensive and assessment management models				
Walk in centre for Illness and Injury for CYP	1692	64%	192,927	114
PACS Acute Health Centre for CYP	1988	75%	236,230	119
Model: Enhanced General Practice Models				
Enhanced GP practice	747	28%	80,940	108
GP federation service for CYP	1180	45%	121,470	103

Strengths and limitations

Data were collected prospectively using senior paediatric trainees on each shift entering data in real time. All patients presenting during peak times were included with data on patient need, investigations and management. The proportions of illnesses were similar to those seen in other published studies of ED presentations.¹

The data has identifiable limitations. Data were only collected after 1000h, so we could not fully assess models with earlier opening hours. Few patients present at this time and as the proportions presenting between 0800h and 1000h are likely to be similar to those presenting later this is unlikely to affect the data. Patient identifiable data including gender and ethnicity and deprivation could not be collected. Data on re-attendances within two weeks could not be collected. This is unlikely to be an issue as re-attendance is not directly relevant to the aims of this study and unplanned re-attendance rates within seven days are < 5%.⁷

Estimates are made of those children and young people who are potentially appropriately managed in each model. Patients and parents will make choices about where they attend that are unrelated to whether a child is appropriately managed in different scenarios. As we did not directly collect data from patients, we have no data on why parents/young person may have chosen to attend ED rather than primary care.

Next steps

This report will be revised in mid-2017 with the addition of further data on the workforce appropriate to manage each new model, together with costs of this workforce, to provide commissioners and providers with additional data to support planning of out of hospital models of care in London.

Appendix 1: Glossary

Acronym	Description
APNP	Advanced paediatric nurse practitioner
BG	Blood glucose
CAMHS	Child and adolescent mental health services
CCGs	Clinical Commissioning Groups
CCN	Children's Community Nursing
CYP	Children and young people
ED	Emergency department
ENT	Ear Nose and Throat
GP	General Practitioner
HLP	Healthy London Partnership
HRG	Healthcare resource group
IV	Intravenous
Ix	Investigations
LP	Lumbar Puncture
LTC	Long Term Condition
MCS	Multi-Specialty Community Provider
NG	Nasogastric
NRES	National research ethics system

Acronym	Description
NW	North West
OOH	Out of hospital
OPD	Outpatients department
PACS	Primary and Acute Care System
PAU	Paediatric Assessment Unit
PNP	Paediatric nurse practitioner
RLH	Royal London Hospital
Rx	Prescriptions
ST4	Speciality trainee 4
UCL	University College London

Appendix 2: Methodology

Detail of Study, Data Collection and Methods of Analysis

Methods

To answer the research questions we undertook prospective data collection from children and young people attending EDs across 6 sites in London, obtaining data on treatment received but also on clinical need.

Sites

We recruited six EDs seeing significant numbers of children across London. We only included sites within areas that did not have new models of care for acutely unwell children and young people operating. The 6 sites were spread across London: Royal London Hospital, Newham Hospital, Whipps Cross Hospital, St. George's Hospital, St. Hellier Hospital and Kingston Hospital.

Data collection

We prospectively collected data on all children and young people attending EDs in the participating sites from 10am to 10pm (to cover peak presentations) during 14 days during the winter peak season (22nd Feb to 6th March 2016).

Eligible children and young people were all who were triaged and given a clear diagnosis or management plan during the included hours and were aged <18 years. Those who did not have a diagnosis/management plan by the end of shift were excluded.

Data were collected by a supernumerary paediatrician (ST4 or above) employed specifically for this project, who had access to the hospital information systems for that site but did not have any clinical responsibilities during the shift. The study paediatrician obtained data from the ED staff managing each of the patients in real time and from clinical records where necessary. They did not have direct contact with patients during the shift. In total, 21 study paediatricians completed study shifts, and were responsible for entering data on 33 to 569 patients each. Data were recorded either directly onto an online secure data collection system or onto paper forms and then transcribed onto the online system later in the shift.

In summary this included two categories of data:

A. Data on the ED presentation: time of presentation, date of birth, patient segment (exacerbation of long-term condition (LTC), complex LTC/disability, well child with transient acute illness, injury/trauma/poisoning, non-trauma surgery, mental health and safeguarding), severity, investigations and management that were received, whether a period of observation had occurred, staff types and seniority who saw the child and outcome of the ED presentation (i.e. whether admitted, discharged and what follow-up planned).

B. Data relating to whether the child could have been managed in an out of hospital model: These data included i) the clinical skills that were needed to assess and manage the child (i.e. illness or injury skills, level of specialization, and during which time frame these were required); ii) the time frame in

which investigations and management needed were required (given that they might not be available immediately in an out of hospital setting); iii) whether a period of observation was needed, and for how long; iv) the type and frequency of follow-up needed if a range of 15 hour community nursing or telephone advice services were available; and v) whether the presentation could have been avoided given better health education for the family.

Analysis

Data were first cleaned. This included reassigning segment according to specified diagnosis. We then provided simple descriptive statistics for the cohort overall, and for the group appropriate to each model. Note that only 4 of the patient segments were potentially manageable within out of hospital models (transient acute illness, exacerbation of Long Term Condition (LTC), complex LTC/disability and trauma) with the other segments (safeguarding, Child and Adolescent Mental Health (CAMHS), non-trauma surgery) not considered appropriate for out of hospital care in the models under study.

We developed an algorithm for each model of care under study to allow us to work out which groups of children were potentially able to be appropriately managed within each model. The algorithms were sequentially based upon, in order, segment, diagnostic group, severity, age range, opening hours and days of service, clinician expertise required and timescale, investigations needed and timescale and management needed and timescale. Algorithms are shown in Appendix 03. The algorithms were used to assign each child a binary variable indicating whether or not they were appropriate for management in each model of care. These variables were then used to define the cohort likely to be appropriately managed within each model. Note that children and young people could potentially be appropriately managed in multiple models of care.

Assessment of effects of site and observer (study paediatrician) were made using multilevel models including random effects for site and observer.

Financial methods

Financial modelling was undertaken. Eligibility for each of the new models of care was used as an input to the costing modelling work. The first stage of the costing modelling was to match the study data with the activity records held at each of the Trusts that participated in the study. Data held on each patient included date of birth and date and time of presentation to ED; these were not identifiable data outside the Trust but allowed each Trust to match financial data to study data for each patient.

Trusts were unable to match 379 (13%) of the 3020 patients (Numbers and % unmatched were Barts 184 (14%); Kingston 22(5%); St. George's 22(3%); St. Hellier's 51(9%). These are likely due to errors in recording of date of birth or time of presentation.

Trusts then provided the corresponding HRG codes for each study participant, including those for the ED presentation and for any subsequent admissions related to that ED presentation.

The modelling work then matched the HRG codes against published 2015-16 NHS tariffs and adjusted the tariff price for the published market forces factor for each Trust to evaluate the tariff cost of each study participant. Following that, the costs for each study participant were then mapped to the each of the new models of care described previously to evaluate total cost and average cost for the participants appropriate for each model of care.

Permissions

The National Research Ethics system (NRES) was consulted. It was concluded that as no patients would be recruited and as this was a service evaluation project, that research ethics permissions were not required. Clinical Directors for Paediatrics at each site gave permission for the study to be conducted on that site and arranged appropriate Trust Research and Development permissions where necessary. The Caldicott Guardians at each site gave permission for the collection of the required data on patients, including minimal identifiers (only date of birth and time and site of presentation were collected).

Findings

Data on 3,020 CYP were judged eligible for the study. Patient characteristics across the whole sample and by site are shown in Table 4. Overall 95.6% of patients were within the four segments considered appropriate for the out of hospital models.

Needs for assessment, investigation and management are shown in Table 2 for the whole sample and by site. The majority of presentations required assessment by a clinician with skills in assessing illness or injuries, with only 2.1% requiring a specialist paediatric opinion and 6.8% requiring other specialist opinions. The latter were largely Ear Nose Throat (ENT) or Ophthalmology opinions. In terms of treatment needs, 33.3% were provided with no treatment other than reassurance.

Table 3 shows outcomes and patient destination by hospital site. Only 7% required observation for >12 hours or inpatient admission, with 56.5% judged to have been able to manage at home if the family had been self-confident. 42.2% of presentations were judged to have been totally avoidable if the family had had better health promotion.

Variation across sites and by observers

We tested the impact of observer (study paediatrician) and site factors on key study outcomes. In a multilevel model for likelihood of a patient requiring admission, including random effects for site and observer, only 0.7% of the total variance was explained by site and only 4% by observer factors, suggesting that site and observer made minimal differences to the findings shown here.

Appendix 3: Acknowledgements and thanks

This report has been developed through the Healthy London Partnership's Children and Young People's Acute model of care Clinical Advisory Group. We would particularly like to express our appreciation to the following members:

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Appendix 5: References

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